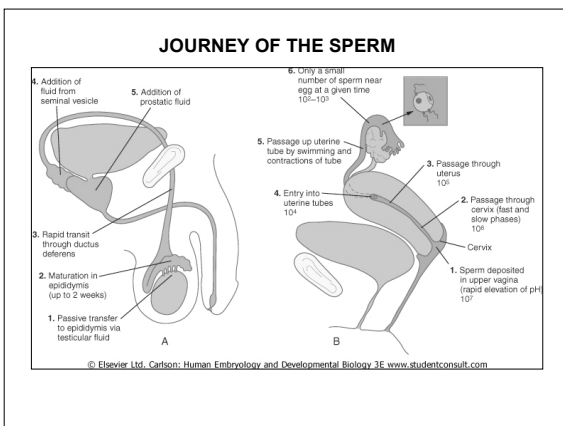
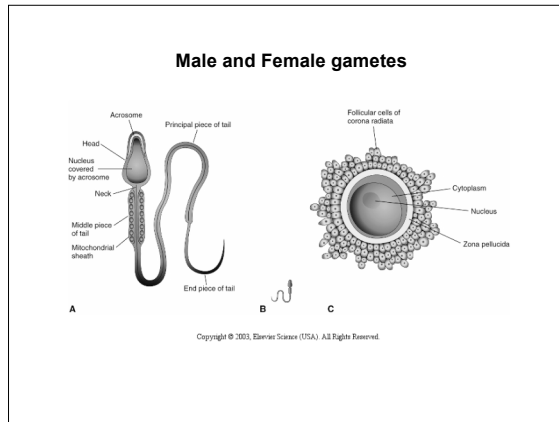
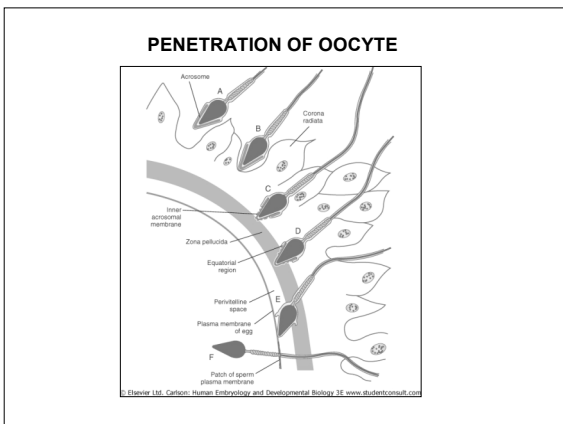


Fertilization, Placenta and Fetus

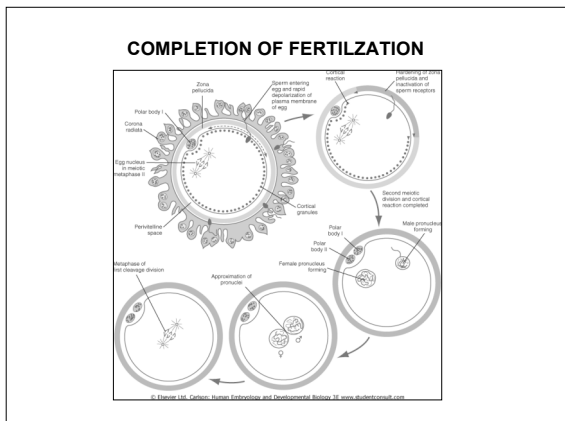


- ### SEQUENCE OF EVENTS
- 3: Spermatogenesis, spermiogenesis and spermiation in testis.
 - 2: Biochemical maturation in epididymis.
 - 1: Addition of prostatic and seminal vesicle fluids (fructose, buffers, ions).
 - 0: Ejaculation and deposition into vagina (optimum pH 6.0-6.5).
 - 1: Penetration of cervical mucus (most hospitable on days 9-16).
 - 2: Capacitation in tubes (required for later acrosomal reaction).



- ### SEQUENCE OF EVENTS
- 3: Penetration of corona radiata (hyaluronidase from sperm).
 - 4: Binding (species specific): zona pellucida (ZP3 gp.) & sperm receptor.
 - 5: Acrosomal reaction with release of acrosin and other enzymes.
 - 6: Penetration of zona pellucida, entry into perivitelline space.
 - 7: Binding: $\alpha 6 \beta 1$ integrin of egg with fertilin on sperm plasma membranes.
 - 8: Fusion: of egg and sperm plasma membranes.
 - 9: Entry of sperm head, midpiece and tail into egg cytosol.

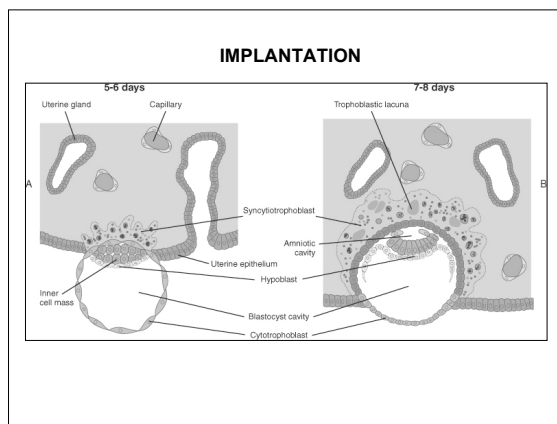
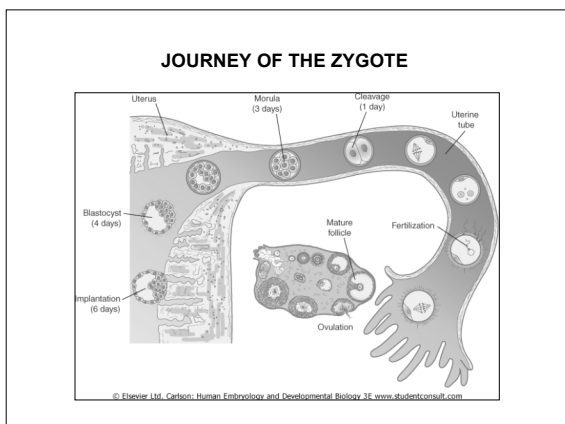
HD23 - Fertilization, Placenta and Fetus



- ### SEQUENCE OF EVENTS
- 10: Fast block to polyspermy-** depolarization of egg plasma membrane.
 - membrane potential goes from -70 mV to +10mV in 2-3 seconds.
 - lasts for 5 minutes.
 - 11: Slow block to polyspermy-** Calcium influx into egg and cortical reaction.
 - polysaccharides in perivitelline space cause hydration and swelling.
 - hydrolytic enzymes enter zona and hydrolyze ZP3: zona reaction.
 - 12: Metabolic activation of egg-** probably related to Calcium release.
 - 13: Decondensation of sperm nucleus-** formation of male pronucleus.
 - Sulfhydryl reduction of sperm protamines by egg.
 - 14: Completion of oocyte meiosis II,** formation of female pronucleus.
 - 15: Fusion of pronuclei and formation of first mitotic spindle: ZYGOTE.**

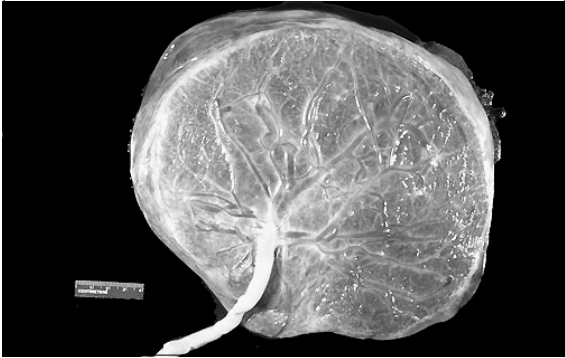
- ### IMPORTANCE OF ZONA PELLUCIDA
- Allows only sperm of the same species to access the egg.
 - Initiates the acrosomal reaction.
 - Participates in the polyspermy block.
 - Acts as a porous filter through which certain substances can reach the embryo.
 - Serves as an immunological barrier between the mother and the embryo.
 - Prevents the blastomeres of the early cleaving embryo from dissociating.
 - Prevents premature implantation of the cleaving embryo.

PLACENTA

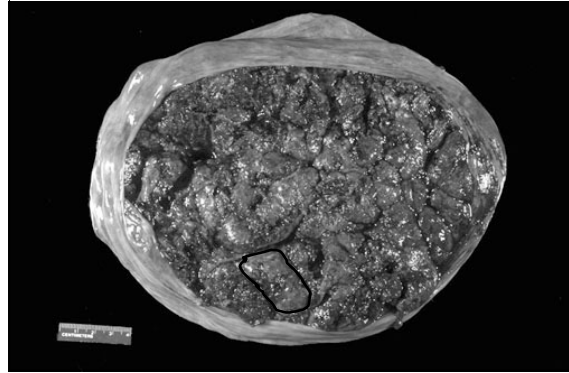


HD23 - Fertilization, Placenta and Fetus

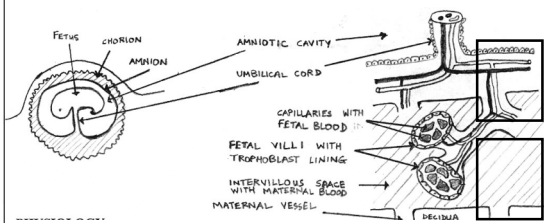
PLACENTA: FETAL SURFACE



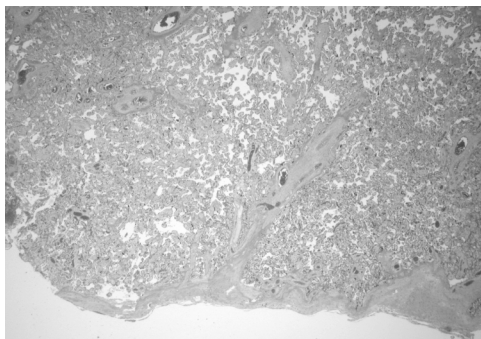
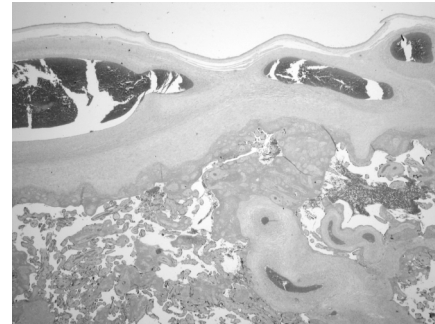
PLACENTA: MATERNAL SURFACE



HISTOLOGY: PLACENTAL DISC

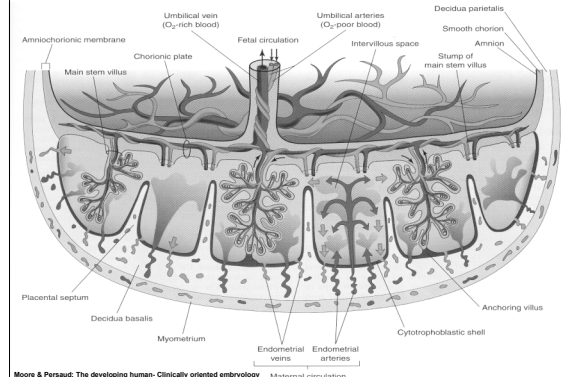


HISTOLOGY: PLACENTAL DISC-FETAL SURFACE

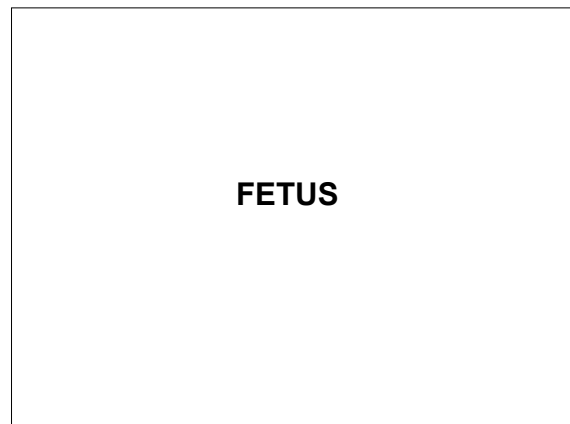
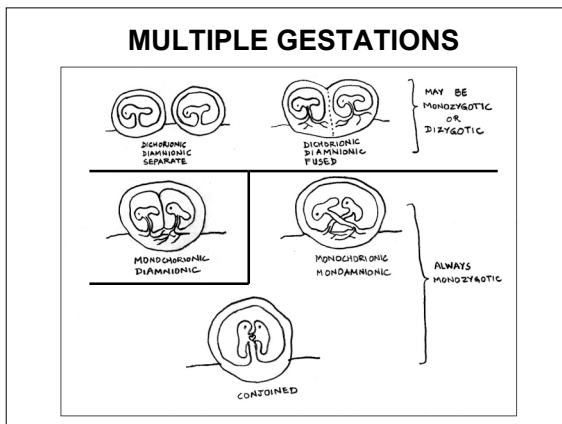
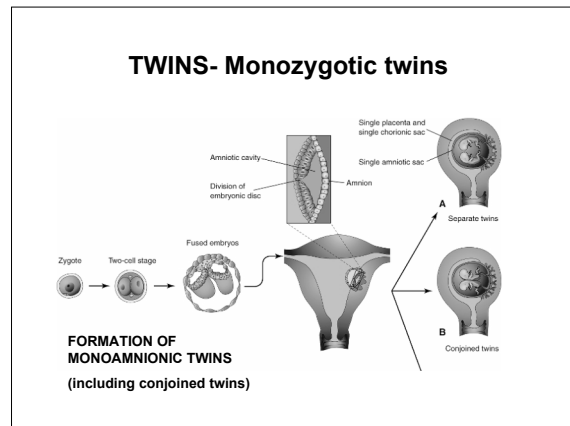
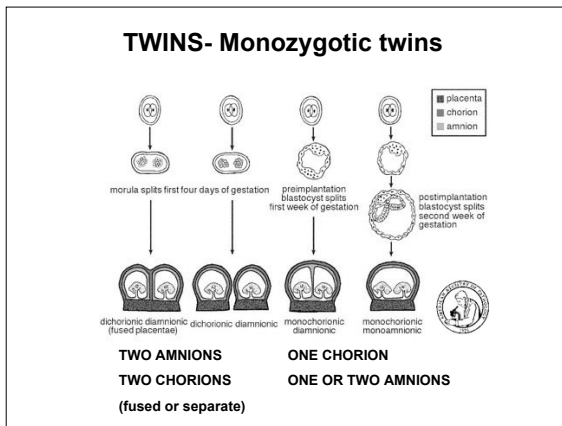
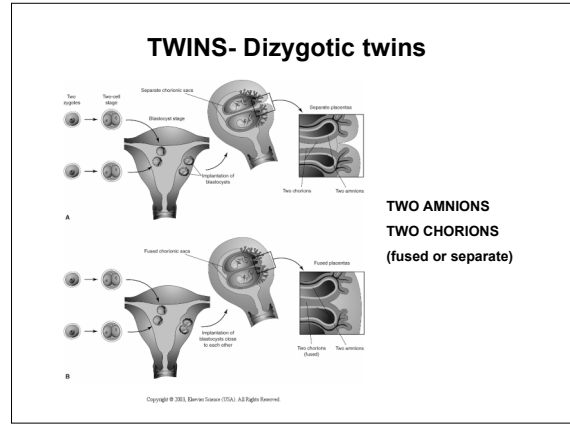
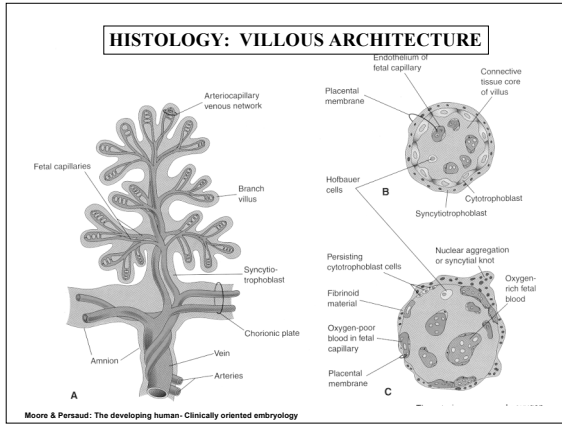


HISTOLOGY: PLACENTAL DISC-MATERNAL SURFACE

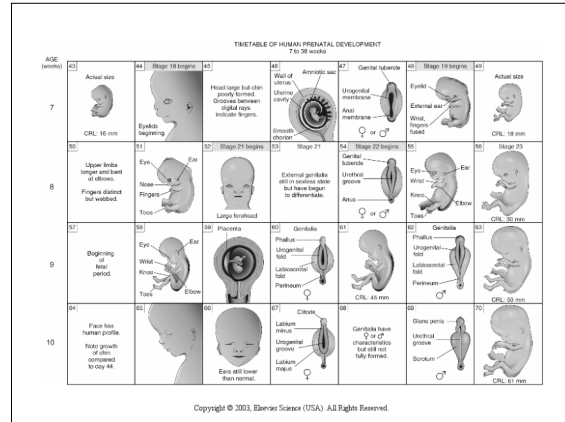
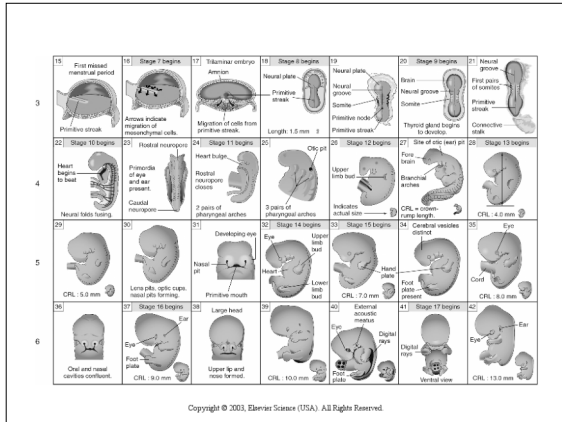
PLACENTAL VASCULAR ANATOMY:



HD23 - Fertilization, Placenta and Fetus



HD23 - Fertilization, Placenta and Fetus



MILESTONES IN FIRST TRIMESTER

(in completed post-conception weeks, a.k.a. fertilization age)

- 1wk- Implantation.
- 2wk- Formation of chorionic villi.
- 3wk- Gastrulation, formation of somites, beginning of neural folds.
- 4wk- Heart beats. Closed neural canal. Limb buds and lens placodes appear.
- 5wk- Face taking form. Hand plate and foot plate form.
- 6wk- Fingers and toes form. Face better defined with eyes and ear.
- 7wk- Genital tubercle forming.
- 8wk- Tail disappears. Midgut herniation begins.

EMBRYONIC STAGE ENDS, FETAL STAGE BEGINS

- 9wk- Early muscular movements begin to occur (imperceptible to mother).
- 10wk- External genitalia become gender specific. Gut returns to abdomen.
- 11wk- Urine excretion begins (into amniotic cavity).
- 12wk- Fetus has well-formed neck. Fetus swallows amniotic fluid (urine and all).

MILESTONES IN SECOND TRIMESTER

- 4 months: Fine downy fetal hair "lanugo" on fetal head.
Thumb sucking movements.
Fetal "brown fat" develops (involved in heat production).
Active ossification of bones.
- 5 months: Lanugo hair covers most of body.
"Vernix caseosa" begins to be deposited on the skin.
Eyelids and eyebrows visible.
Mother starts to feel fetal movements "quickening" around 18-19wks.
- 6 months: SURFACTANT SECRETION starts around 24 wks.
Skin is wrinkled, translucent.

Late second trimester newborn baby

MILESTONES IN THIRD TRIMESTER

- 7 months: Eyes open.
Subcutaneous fat (not brown fat) forms, smoothening out wrinkles.
Testes descending into scrotum.
Sulci and gyri appear in brain.
- 8 months: Skin becomes pink and smooth.
Fat deposition continues, fetus has a 'chubby' appearance.
Pupillary light reflex develops.
- 9 months: Lanugo hairs are lost.
Skin covered all over with vernix caeseosa.
Testes completely descended by 38 wks.
Myelination of brain BEGINS.

HD23 - Fertilization, Placenta and Fetus

